

#EC-42
RJ

SURFACE TRANSPORTATION BOARD

Washington, DC 20423

Office of Economics, Environmental Analysis, and Administration

October 23, 2003

Richard Allen
Research Analyst
Cherokee Nation
P.O. Box 948
Tahlequah, OK 74465

Re: STB Finance Docket 34284, Southwest Gulf Railroad Company –
Construction and Operation Exemption – Medina County, TX

Dear Mr. Allen:

On October 10, 2003, the Surface Transportation Board's Section of Environmental Analysis (SEA) mailed to you a copy of the Preliminary Cultural Resources Assessment report for the proposed rail construction and operation in Medina County, Texas. SEA has subsequently completed a study of potential vibration impacts to cultural resources in the area of the proposed project and believes that this information may assist in your review of the report. Please find a copy of SEA's vibration study enclosed.

As stated in our prior letter, we request your written comments on the report by November 10, 2003. If you have questions regarding the vibration study or the report or require further information, please do not hesitate to contact me or Rini Ghosh of my staff at (202) 565-1539.

Sincerely,



Victoria Rutson
Chief
Section of Environmental Analysis

Enclosure

SURFACE TRANSPORTATION BOARD

Washington, DC 20423

Office of Economics, Environmental Analysis, and Administration

October 23, 2003

Mr. Jim Arterberry
c/o Comanche Nation
P.O. Box 908
Lawton, OK 73502

Re: STB Finance Docket 34284, Southwest Gulf Railroad Company –
Construction and Operation Exemption – Medina County, TX

Dear Mr. Arterberry:

On October 10, 2003, the Surface Transportation Board's Section of Environmental Analysis (SEA) mailed to you a copy of the Preliminary Cultural Resources Assessment report for the proposed rail construction and operation in Medina County, Texas. SEA has subsequently completed a study of potential vibration impacts to cultural resources in the area of the proposed project and believes that this information may assist in your review of the report. Please find a copy of SEA's vibration study enclosed.

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Sincerely,



Victoria Rutson
Chief
Section of Environmental Analysis

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SURFACE TRANSPORTATION BOARD

Washington, DC 20423

Office of Economics, Environmental Analysis, and Administration

October 23, 2003

Kickapoo Traditional Tribe of Texas
HC 1
Box 9700
Eagle Pass, TX 78852

Re: STB Finance Docket 34284, Southwest Gulf Railroad Company –
Construction and Operation Exemption – Medina County, TX

Dear Tribal Representative:

On October 10, 2003, the Surface Transportation Board's Section of Environmental Analysis (SEA) mailed to you a copy of the Preliminary Cultural Resources Assessment report for the proposed rail construction and operation in Medina County, Texas. SEA has subsequently completed a study of potential vibration impacts to cultural resources in the area of the proposed project and believes that this information may assist in your review of the report. Please find a copy of SEA's vibration study enclosed.

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Sincerely,



Victoria Rutson
Chief
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SURFACE TRANSPORTATION BOARD

Washington, DC 20423

Office of Economics, Environmental Analysis, and Administration

October 23, 2003

Mr. Robert Hancock
Chairman
Medina County Historical Commission
Medina County Courthouse
Hondo, TX 78861

Re: STB Finance Docket 34284, Southwest Gulf Railroad Company –
Construction and Operation Exemption – Medina County, TX

Dear Mr. Hancock:

On October 10, 2003, the Surface Transportation Board's Section of Environmental Analysis (SEA) mailed to you a copy of the Preliminary Cultural Resources Assessment report for the proposed rail construction and operation in Medina County, Texas. SEA has subsequently completed a study of potential vibration impacts to cultural resources in the area of the proposed project and believes that this information may assist in your review of the report. Please find a copy of SEA's vibration study enclosed.

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Sincerely,



Victoria Rutson
Chief
Section of Environmental Analysis

Enclosure

SURFACE TRANSPORTATION BOARD

Washington, DC 20423

Office of Economics, Environmental Analysis, and Administration

October 23, 2003

Mrs. Cynthia Lindsey
Quihi & New Fountain Historical Society
P.O. Box 93
190 CR 4512
Hondo, TX 78861

Re: STB Finance Docket 34284, Southwest Gulf Railroad Company –
Construction and Operation Exemption – Medina County, TX

Dear Mrs. Lindsey:

On October 10, 2003, the Surface Transportation Board's Section of Environmental Analysis (SEA) mailed to you a copy of the Preliminary Cultural Resources Assessment report for the proposed rail construction and operation in Medina County, Texas. SEA has subsequently completed a study of potential vibration impacts to cultural resources in the area of the proposed project and believes that this information may assist in your review of the report. Please find a copy of SEA's vibration study enclosed.

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Sincerely,



Victoria Rutson
Chief
Section of Environmental Analysis

Enclosure

SURFACE TRANSPORTATION BOARD

Washington, DC 20423

Office of Economics, Environmental Analysis, and Administration

October 23, 2003

Dr. Robert Fitzgerald
President
Medina County Environmental Action Association
202 CR 450
Hondo, TX 78861

Re: STB Finance Docket 34284, Southwest Gulf Railroad Company –
Construction and Operation Exemption – Medina County, TX

Dear Dr. Fitzgerald:

On October 10, 2003, the Surface Transportation Board's Section of Environmental Analysis (SEA) mailed to you a copy of the Preliminary Cultural Resources Assessment report for the proposed rail construction and operation in Medina County, Texas. SEA has subsequently completed a study of potential vibration impacts to cultural resources in the area of the proposed project and believes that this information may assist in your review of the report. Please find a copy of SEA's vibration study enclosed.

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Sincerely,



Victoria Rutson
Chief
Section of Environmental Analysis

Enclosure

cc: Dr. Lynn Kitchen

SURFACE TRANSPORTATION BOARD

Washington, DC 20423

Office of Economics, Environmental Analysis, and Administration

October 23, 2003

Ms. Pam Opiela
Project Reviewer
Texas Historical Commission
P.O. Box 12276
Austin, TX 78711-2276

Re: STB Finance Docket 34284, Southwest Gulf Railroad Company –
Construction and Operation Exemption – Medina County, TX

Dear Ms. Opiela:

On October 10, 2003, the Surface Transportation Board's Section of Environmental Analysis (SEA) mailed to you a copy of the Preliminary Cultural Resources Assessment report for the proposed rail construction and operation in Medina County, Texas. SEA has subsequently completed a study of potential vibration impacts to cultural resources in the area of the proposed project and believes that this information may assist in your review of the report. Please find a copy of SEA's vibration study enclosed.

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Victoria Rutson
Chief
Section of Environmental Analysis

Enclosure

SURFACE TRANSPORTATION BOARD

Washington, DC 20423

Office of Economics, Environmental Analysis, and Administration

October 23, 2003

Mr. David Coburn
Steptoe & Johnson, LLP
1330 Connecticut Avenue, NW
Washington, DC 20036-1795

Re: STB Finance Docket 34284, Southwest Gulf Railroad Company –
Construction and Operation Exemption – Medina County, TX

Dear Mr. Coburn:

On October 10, 2003, the Surface Transportation Board's Section of Environmental Analysis (SEA) mailed to you a copy of the Preliminary Cultural Resources Assessment report for the proposed rail construction and operation in Medina County, Texas. SEA has subsequently completed a study of potential vibration impacts to cultural resources in the area of the proposed project and believes that this information may assist in your review of the report. Please find a copy of SEA's vibration study enclosed.

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Victoria Rutson
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SURFACE TRANSPORTATION BOARD

Washington, DC 20423

Office of Economics, Environmental Analysis, and Administration

October 23, 2003

Mr. Donald Schoch
President
Schweers Historical Foundation
2405 IH-35 South, Suite 102
New Braunfels, TX 78130-8817

Re: STB Finance Docket 34284, Southwest Gulf Railroad Company –
Construction and Operation Exemption – Medina County, TX

Dear Mr. Schoch:

On October 10, 2003, the Surface Transportation Board's Section of Environmental Analysis (SEA) mailed to you a copy of the Preliminary Cultural Resources Assessment report for the proposed rail construction and operation in Medina County, Texas. SEA has subsequently completed a study of potential vibration impacts to cultural resources in the area of the proposed project and believes that this information may assist in your review of the report. Please find a copy of SEA's vibration study enclosed.

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Sincerely,



Victoria Rutson
Chief
Section of Environmental Analysis

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SURFACE TRANSPORTATION BOARD

SECTION OF ENVIRONMENTAL ANALYSIS

STB Finance Docket 34284 – Southwest Gulf Railroad Company – Construction and Operation Exemption – Medina County, TX

VIBRATION STUDY

This report describes the existing ground-borne vibration and noise-induced vibration environment in the area of the proposed project and identifies cultural resources that may be affected by vibration. The following discussion describes the fundamentals of vibration and sets forth vibration calculations for known cultural resources near the proposed route and alternatives.

1.0 Fundamentals of Vibration

Vibration is defined as any oscillatory motion induced in a structure or mechanical device as a direct result of some type of input excitation. Vibration consists of waves transmitted through solid material (Beranek and Ver 1992). There are several types of wave motion in solids, unlike in air, including compressional, shear, torsional, and bending. The solid medium can be excited by forces, moments, or pressure fields. This leads to the terminology “air-borne” (pressure fields) or “structure-borne/ground-borne” (forces and moments) vibration.

Ground-borne vibration propagates from the source through the ground to adjacent buildings by surface waves. Vibration may be comprised of a single pulse, a series of pulses, or a continuous oscillatory motion. The frequency of a vibrating object describes how rapidly it is oscillating, measured in Hertz (Hz). Most environmental vibrations consist of a composite, or “spectrum” of many frequencies, and are generally classified as broadband or random vibrations. The normal frequency range of most ground-borne vibration that can be felt generally starts from a low frequency of less than 1 Hz to a high frequency of about 200 Hz. Ambient and source vibration information for this study has been measured in terms of the peak particle velocity (PPV) in inches per second (in/sec) that correlates best with human perception. The particle velocity is the velocity of the soil particles resulting from a disturbance. Agencies such as the Federal Transit Administration (FTA) and the National Park Service (NPS) use PPV as a descriptor because it is related to the stresses experienced by buildings.

Vibration energy spreads out as it travels through the ground, causing the vibration amplitude to decrease with distance away from the source. High frequency vibrations reduce much more rapidly than low frequencies, so that in the far-field from a source the low frequencies tend to dominate. Soil properties also affect the propagation of vibration. When ground-borne vibration interacts with a building there is usually a ground-to-foundation coupling loss but the vibration can also be amplified by the structural resonances of the walls and floors. Vibration in buildings is typically perceived as rattling of windows or items on shelves or the motion of building surfaces. The

vibration of building surfaces can also be radiated as sound and heard as a low-frequency rumbling noise, known as ground-borne noise.

1.1 REGULATORY FRAMEWORK

1.1.1 Vibration

Federal Transit Administration (FTA) and Federal Railroad Administration (FRA)

The FTA and FRA have published guidelines for assessing the impacts of ground-borne vibration associated with construction of rail projects, which have been applied by other jurisdictions to other types of projects (FTA 1995). The FTA measure of the threshold of architectural damage for conventional sensitive structures is 0.2 in/sec PPV. The threshold of perception of vibration is 0.01 in/sec PPV.

National Park Service

The National Park Service (NPS) has published guidelines for assessing the impacts of vibration on historic structures (NPS 1984). The following parameters are suggested for safe levels of vibration:

- 1) 0.2 in/sec PPV for structures that exhibit significant levels of historic or architectural importance (typical of Category A and B structures in the NPS's List of Classified Structures), or that are in a poor or deteriorated state of maintenance.
- 2) 0.5 in/sec PPV for all other historic sites.

1.2 POTENTIAL VIBRATION IMPACTS ON CULTURAL RESOURCES

1.2.1 Proposed Project

1.2.1.1 Construction

Sixteen 19th century cultural resource sites are located within approximately 250 feet to 5,300 feet from the proposed route (Table 1). The structural integrity and the capacity for these resources to be affected by ground-borne vibration vary.

Construction activity can result in varying levels of ground vibration, depending on the equipment and methods used. Operation of construction equipment causes ground vibrations, which spread through the ground and diminish in strength with distance. Ground vibrations from construction activities very rarely reach levels that can damage structures, but can be noticeable close to the source. The construction activities that generate the highest level of vibration are blasting and pile driving. These activities would not occur as part of the proposed project.

The California Department of Transportation (Caltrans) has conducted extensive vibration measurements on construction activities. With the exception of pile driving and pavement breaking, all Caltrans construction vibration measurements have been below

0.2 in/sec. At 25 feet, vibration levels from equipment such as trucks, jackhammers, and bulldozers range from approximately 0.04 to 0.09 in/sec (Caltrans 1996). Based on the distance from the source of the proposed construction to known cultural resources, there would be no significant impact to known cultural resources as a result of ground-borne vibration.

1.2.1.2 Operation

As discussed above, sixteen 19th century cultural resource sites are located within approximately 250 feet to 5,300 feet from the proposed railroad alignment (Table 1). The structural integrity and the capacity for these resources to be affected by ground-borne vibration vary.

Ground vibration from trains was assessed using the General Vibration Assessment methods contained in the FTA Transit Noise and Vibration Impact Assessment manual (FTA 1995). The manual uses generalized data to develop a curve of vibration level as a function of the distance from the track.

The assumptions made for the assessment include: (1) the use of welded rail, (2) wheels/rail are in good condition, (3) the vehicles have non-stiff suspension, and (4) the track is stiffly supported. Traffic would be four 5,800 trains per day with two locomotives. The maximum train speed would be 25 mph. Therefore, a vibration level of 0.2 in/sec would occur at approximately 45 feet from the tracks.

The closest historic structure to the proposed route would be at least 250 feet from the tracks. No cultural resource would be located within the 45-foot impact distance from the tracks. Thus, there would be no ground-borne vibration impacts to known cultural resources as a result of proposed railroad operations.

1.2.2 Alternative Route 1

1.2.2.1 Construction

Sixteen 19th century cultural resource sites are located within approximately 125 feet to 2,800 feet from this alternative rail alignment (Table 1). At 25 feet, vibration levels from equipment such as trucks, jackhammers, and bulldozers range from approximately 0.04 to 0.09 in/sec. As a result of distance from the source to the cultural resources, ground-borne vibration impacts to known cultural resources as a result of the proposed construction would not be significant.

1.2.2.2 Operation

As discussed above, sixteen 19th century cultural resource sites are located within approximately 125 feet to 2,800 feet from this alternative rail alignment (Table 1). Vibration levels of 0.2 in/sec would occur at approximately 45 feet from the tracks. The closest historic structure would be at least 125 feet from the tracks. No cultural resource would be located within the 45-foot impact distance from the tracks. Therefore, there would be no ground-borne vibration impacts to known cultural resources as a result of proposed railroad operations.

1.2.3 Alternative Route 2

1.2.3.1 Construction

Sixteen 19th century cultural resource sites are located within approximately 250 feet to 3,800 feet from this alternative railroad alignment (Table 1). At 25 feet, vibration levels from equipment such as trucks, jackhammers, and bulldozers range from approximately 0.04 to 0.09 in/sec. As a result of distance from the source to the cultural resources, ground-borne vibration impacts as a result of construction would not be significant.

1.2.3.2 Operation

As discussed above, sixteen 19th century cultural resource sites are located within approximately 250 feet to 3,800 feet from this alternative rail alignment (Table 1). Vibration levels of 0.2 in/sec would occur at approximately 45 feet from the tracks. The closest historic structure would be at least 250 feet from the tracks. No cultural resource would be located within the 45-foot impact distance from the tracks. Therefore, there would be no ground-borne vibration impacts to known cultural resources as a result of proposed railroad operations.

1.2.4 Alternative Route 3

1.2.4.1 Construction

Sixteen 19th century cultural resource sites are located within approximately 250 feet to 7,600 feet from this alternative railroad alignment (Table 1). At 25 feet, vibration levels from equipment such as trucks, jackhammers, and bulldozers range from approximately 0.04 to 0.09 in/sec. As a result of distance from the source to the cultural resources, ground-borne vibration impacts to known cultural resources as a result of construction would not be significant.

1.2.4.2 Operation

As discussed above, sixteen 19th century cultural resource sites are located within approximately 250 feet to 7,600 feet from this alternative rail alignment (Table 1). Vibration levels of 0.2 in/sec would occur at approximately 45 feet from the tracks. The closest historic structure would be at least 250 feet from the tracks. No cultural resource would be located within the 45-foot impact distance from the tracks. Therefore, there would be no ground-borne vibration impacts to known cultural resources as a result of proposed railroad operations.

1.2.5 No Build Alternative

1.3.5.1 Construction

No construction of rail would occur under this alternative. Therefore, there would be no construction-related vibration impacts to known cultural resources from the proposed rail line construction.

1.2.5.1 Operation

No rail operations would occur under this alternative. Therefore, there would be no operations-related vibration impacts to known cultural resources from proposed railroad operations.

1.3 REFERENCES

Beranek, L.L. and I.L. Ver, eds. 1992. Noise and Vibration Control Engineering. John Wiley & Sons, Inc. New York, NY.

California Department of Transportation. 1996. Transportation Related Earthborne Vibration, Technical Advisory TAV-96-01-R9201. June 13.

Federal Transit Administration . 1995. *Transit Noise and Vibration Impact Assessment Manual*, DOT-T-95-16, April 1995. Prepared by Harris Miller Miller & Hanson Inc.

National Park Service. 1984. Assessing the effect of vibration on historic buildings. Bulletin for the Association for Preservation Technology Volume XVI No. 3 and 4.

Table 1
Summary of 19th Century Cultural Resources Within 1000 Feet of the
Proposed Route and the Alternative 1, 2, and 3 Alignments Listed from
North to South with Eligibility

Description	County Road	Proposed Route	Alternative Route 1	Alternative Route 2	Alternative Route 3	Eligibility Status for NR Listing
Oeffinger G-A Cottage	CR 365	1800	1800	1800	250	Unknown
Saathoff Victorian Cottage	CR 365	2800	2800	2800	650	Potential
Saathoff G-A Cottage	CR 365	2400	2400	2400	800	Potential
G-A Cottage Ruins	CR 365	2400	2400	2400	600	Potential
Henry Schweers House	CR 365	250	800	250	2200	Eligible
Schweers Cemetery	CR 365	1500	200	600	3200	Unknown
William Schweers House	CR 365	1800	125	800	3200	Eligible
G-A Cottage Ruins	CR 450	2000	400	1200	3800	Potential
Pichot Property	CR 365	1000	1200	400	2400	Unknown
Schuele-Saathoff (NRHP)	CR 365	1000	2100	1300	2200	Listed
Housely G-A Cottage	CR 365	4300	300	2200	5500	Potential
G-A Cottage Ruins	CR 4516	5300	1000	3400	6800	Potential
Victorian House	CR 4516	5200	800	3100	6400	Unknown
G-A Ruins @ 4311	CR 4516	5000	300	3800	6000	Potential
G-A Cottage @ 4311	CR 4516	4950	125	2500	5800	Potential
Quihi Cemetery	CR 4517	4700	700	3800	7600	Unknown

AD=Archeological Deposits; G-A=Germanic Alsatian; NR=National Register Property